What is claimed is:

1. A plasma processing reactor for semiconductor processing a substrate comprising:

a chamber;

a top electrode configured to be coupled to a first RF power source having a first RF frequency;

a bottom electrode configured to be coupled to second RF power source having a second RF frequency that is lower than said first RF frequency;

an insulating shroud that lines an interior of said chamber, said insulating shroud being configured to be electrically floating during said processing; and

a perforated plasma confinement ring disposed outside of an outer periphery of said bottom electrode, a top surface of said perforated plasma confinement ring being disposed below a top surface of said substrate and electrically grounded during said processing.

2. The plasma processing reactor of claim 1 further comprising a focus ring disposed around said outer periphery of said bottom electrode and abutted to said perforated plasma confinement ring.

3. The plasma processing reactor of claim 1 wherein a distance between said top and bottom electrodes is adjustable.

4. The plasma processing reactor of claim 1 wherein said top electrode includes a multiplicity of gas distribution apertures.

5. The plasma processing reactor of claim 1 wherein said first frequency is about 27 MHz.

6. The plasma processing reactor of claim 1 wherein said bottom electrode represents an electrostatic chuck.

7. The plasma processing reactor of claim 1 wherein said second frequency is about 2 MHz.

8. The plasma processing reactor of claim 1 wherein a distance between said top and bottom electrodes is adjustable between about 0.5 and 2 inches.

9. The plasma processing reactor of claim 1 wherein said insulating shroud is formed from a material that is substantially resistant to etching by a plasma present within said chamber during said processing.

10. The plasma processing reactor of claim 1 wherein an outer diameter of said perforated plasma confinement ring is smaller than the inner diameter of said insulating shroud.

11. The plasma processing reactor of claim 1 wherein an outer diameter of said perforated plasma confinement ring is larger than an inner diameter of said insulating shroud.

12. The plasma processing reactor of claim 1 wherein said perforated plasma confinement ring has a thickness between about ¼ and about 2 inch.

13. The plasma processing reactor of claim 1 wherein said perforated plasma confinement ring is formed from a conductor that is either substantially resistant to etching by a plasma present within said chamber during said processing or contributes substantially no metal contamination.

14. The plasma processing reactor of claim 1 wherein said perforated plasma confinement ring has a multiplicity of perforations configured to permit by-product

gas from said processing to pass through while substantially confining a plasma within a volume defined at least by said insulating shroud; said substrate and said perforated plasma confinement ring.

15. The plasma processing reactor of claim 14 wherein said perforated plasma confinement ring perforations are circularly shaped perforations in diameter.

16. The plasma processing reactor of claim 15 wherein said circularly shaped perforations are between about 1/16 and about 1/8 of an inch.

17. The plasma processing reactor of claim 14 wherein said perforated plasma confinement ring perforations are slotted perforations.

18. The plasma processing reactor of claim 17 wherein said slotted perforations are between about 1/32 and about 1/8 of an inch in width.

19. The plasma processing reactor of claim 14 wherein said perforated plasma confinement ring perforations are concentric ring perforations.

20. The plasma processing reactor of claim 19 wherein the gap between adjacent ones of said concentric ring perforations are between about 1/32 and about 1/8 of an inch apart.

21. The plasma processing reactor of claim 1 wherein said top surface of said perforated plasma confinement ring is disposed less than about 4 inches below said top surface of said substrate.

22. The plasma processing reactor of claim 1 wherein a percentage of open area of said perforated plasma confinement ring is above about 20%.

23. The plasma processing reactor of claim 1 wherein a percentage of open area of said perforated plasma confinement ring is about 50%.

24. A perforated plasma confinement ring device configured to be disposed inside a plasma processing reactor during processing, comprising:

a conductive ring having an inner and outer diameter, said inner diameter being dimensioned to surround an electrode in said plasma processing reactor, said conductive ring being electrically grounded during said processing, said conductive ring having therein a plurality of perforations, said plurality of perforations being dimensioned to permit by-product gases from said processing to pass through while substantially confining a plasma to the upstream side of said conductive ring.

25. The perforated plasma confinement ring of claim 24 wherein said conductive ring has a thickness between about ¼ and about 2 inch.

26. The perforated plasma confinement ring of claim 24 wherein said conductive ring is formed from a conductor that is substantially resistant to etching by a plasma present within said chamber during said processing.

27. The perforated plasma confinement ring of claim 24 wherein said perforated plasma confinement ring perforations are circularly shaped perforations.

28. The perforated plasma confinement ring of claim 27 wherein said circularly shaped perforations are between about 1/16 and about 1/8 of an inch in diameter.

29. The perforated plasma confinement ring of claim 24 wherein said perforated plasma confinement ring perforations are slotted perforations.

30. The perforated plasma confinement ring of claim 29 wherein said slotted perforations are between about 1/32 and about 1/8 of an inch in width.

31. The perforated plasma confinement ring of claim 24 wherein said perforated plasma confinement ring perforations are concentric ring perforations.

32. The plasma processing reactor of claim 31 wherein the gap between adjacent ones of said concentric ring perforations are between about 1/32 and about 1/8 of an inch.

33. The plasma processing reactor of claim 24 wherein a percentage of open area of said perforated plasma confinement ring is above about 20%.

34. The plasma processing reactor of claim 24 wherein a percentage of open area of said perforated plasma confinement ring is about 50%.